d-

i- $E_e = E_L = \frac{E_0}{2}$

$t = \frac{T_0}{8} + K\frac{T_0}{4}$ $k \in IN$

Remarque :

- $E_e = E_0$

$t = K\frac{T_0}{2}$ $k \in IN^*$

- $E_L = E_0$

$t = \frac{T_0}{4} + K\frac{T_0}{2}$

- $E_e = \frac{E_0}{2}$

$E_0 \sin^2(\omega_0 t + \frac{\pi}{2}) = \frac{E_0}{2}$

$\Rightarrow \sin^2(\omega_0 t + \frac{\pi}{2}) = \frac{1}{2}$

$\Rightarrow \sin\left(\omega_0 t + \frac{\pi}{2}\right) = \pm\frac{\sqrt{2}}{2}$

$\Rightarrow \omega_0 t + \frac{\pi}{2} = \frac{\pi}{4} + k\frac{\pi}{2} \Rightarrow \frac{2\pi}{T_0}.t = \frac{\pi}{4} + k\frac{\pi}{2}$

$\Rightarrow t = \frac{T_0}{8} + k\frac{T_0}{4}$ $k \in IN^*$

ii- $E_e = \frac{E_0}{2}$

$\Rightarrow \frac{1}{2}\frac{q^2}{C} = \frac{E_0}{2} \Rightarrow q^2 = C.E_0$

$\Rightarrow q = \pm\sqrt{CE_0} = \pm\sqrt{10^{-6}.5.10^{5}}$ Ou bien = $E_e = \frac{E_0}{2}$

$\Rightarrow q = \pm 7{,}07.10^{-6} C$

$\frac{1}{2}\frac{q^2}{c} = \frac{1}{2}.\frac{1}{2}.\frac{Q^2 max}{c}$

$\Rightarrow q^2 = \frac{Q^2 max}{2}$

$\Rightarrow q = \pm Q_{max}\frac{\sqrt{2}}{2}$

## Exercice N°8

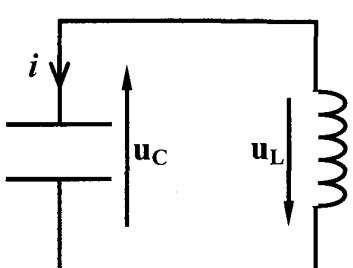
1°)

a- $\frac{d^2u_c}{dt^2} + \omega_0^2 u_c = 0$

$\omega_0^2 = 62500\pi^2$

$\omega_0 = 250\pi$ rad s$^{-1}$

$T_0 = \frac{2\pi}{\omega_0} = \frac{2\pi}{250\pi} = 8.10^{-3} s$




b- $u_c(t) = U_0 \sin(\omega_0 t + \varphi_{u_c})$